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ADVENTURES OF A WATERMOL

A ROMANCE OF THE AIR, THE EARTH AND THE SEA. III

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SYNOPSIS OF THE PUBLISHED CHAPTERS: In the January and February numbers of the MONTHLY the molecule of water has related the story of its volcanic birth in very ancient geologic time and a few of its romantic experiences in wandering over this old earth; adventures in cloud, river, ocean, glacier and iceberg; in ancient plants and animals, and in the outer limits of the atmosphere. It describes its geologic work in pulling down the continents and dragging them to the sea. The story is completed in this issue.

EXPERIENCES IN MESOZOIC TIME

WHEN I escaped from the calms of the equatorial belt I was again in the northern hemisphere. Then it was middle Reptilian or Jurassic time. The huge and wonderful reptiles then ruled the world. Some birds and mammals were living, but they were small in comparison with the big reptiles of both land and sea. I had my experiences with the creatures.

Once when I was in the leaf of a palm one of the enormous reptiles that stalked about on their hind legs, called Dinosaurs, ate my leaf as part of his dinner. When the leaf was digested and I was liberated in the digestive tract I was indignant. Then I was absorbed into the blood circulation, and finally built into the flesh of the huge beast. I think I was in his arm or front leg. When this fellow, the Brontosaurus, which was fifty or sixty feet long, was killed and partly eaten

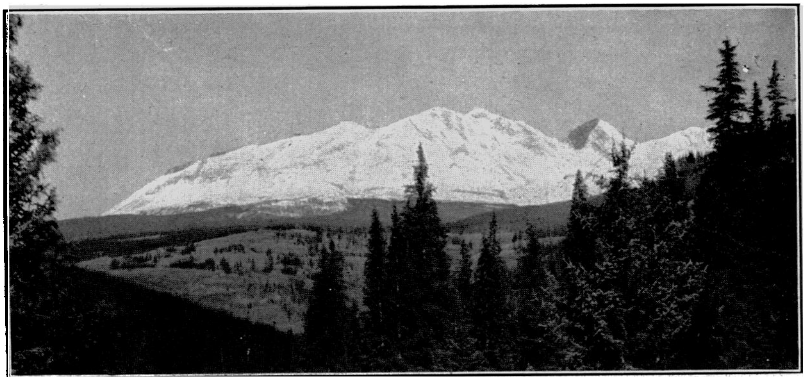


FIG. 23. WATERMOLS WINTERING IN COLORADO.

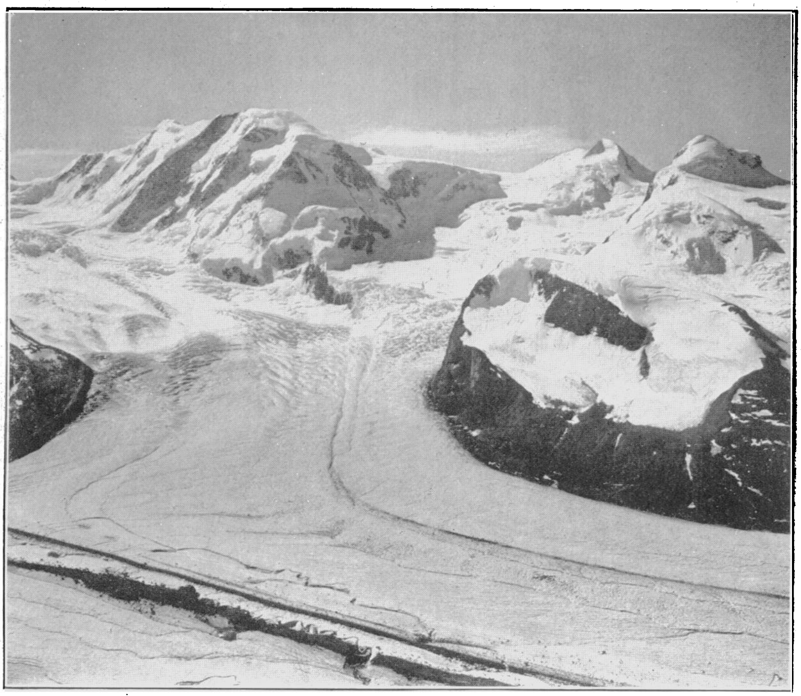


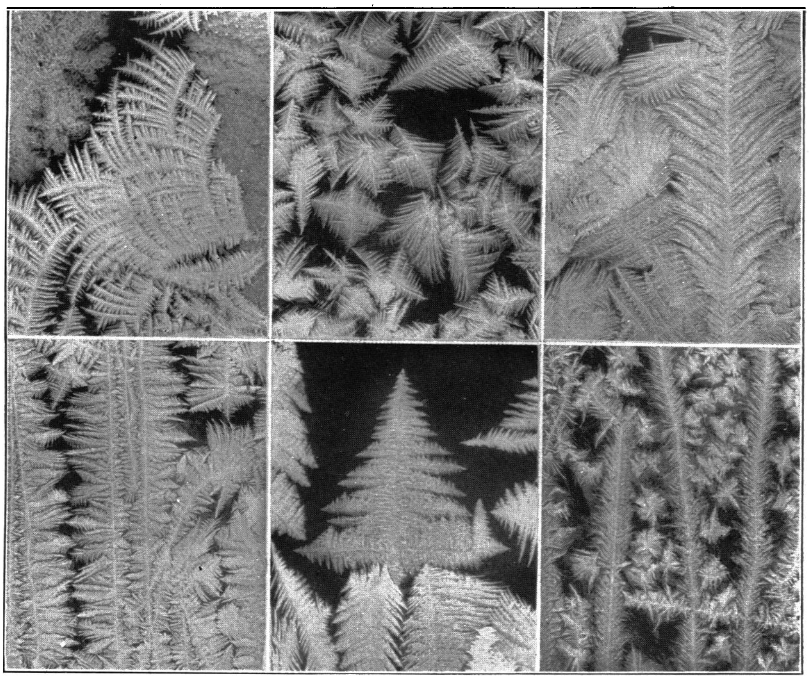
FIG. 24. WATERMOLS TAKING A LONG VACATION.

by a carnivorous Dinosaur I was transferred to the body of the latter. This fellow stalked about on the land on his hind legs, and was the lordly ruler of his time. His favorite range was the region that is now New York and Pennsylvania.

If I were romancing I might tell how I had been in the body of one of the huge dragon-flies of the Jurassic time which was devoured by the flying reptile, the Pterodactylus; or that I had been in the brain or eye of the most ancient bird, the Archeopteryx. But I must hold to the truth. I only saw these remarkable creatures of the olden time.

After various adventures I found myself during Cretaceous time, or later Reptilian period, in the Atlantic ocean. Here I helped in my small way to make the chalk. I was in the protoplasm or soft simple flesh of a microscopic animalcule which had a lime shell. This little Protozoan belongs in the class Foraminifera. Millions on millions of these microscopic beings were floating in the ocean, and when they died and their watery flesh dissolved the tiny shells slowly settled down through the water and, falling on the bottom, made the white, soft deposit known as chalk. The shell which was built by my protozoan fell near Belfast, in Ireland.

Later I was in the substance of the giant Foraminifera which produced the Nummulitic limestone of the region about the Mediter-



W. A. Bently, photo.

FIG. 25. SAMPLES OF WATERMOL ART WORK.

ranean. The shell of my Nummulite is now in a block of limestone which is built into the Great Pyramid. I think that I may rightly claim to have helped build the Pyramids, as truly as if I had been in the blood or brain or muscle of one of Pharaoh's slaves.

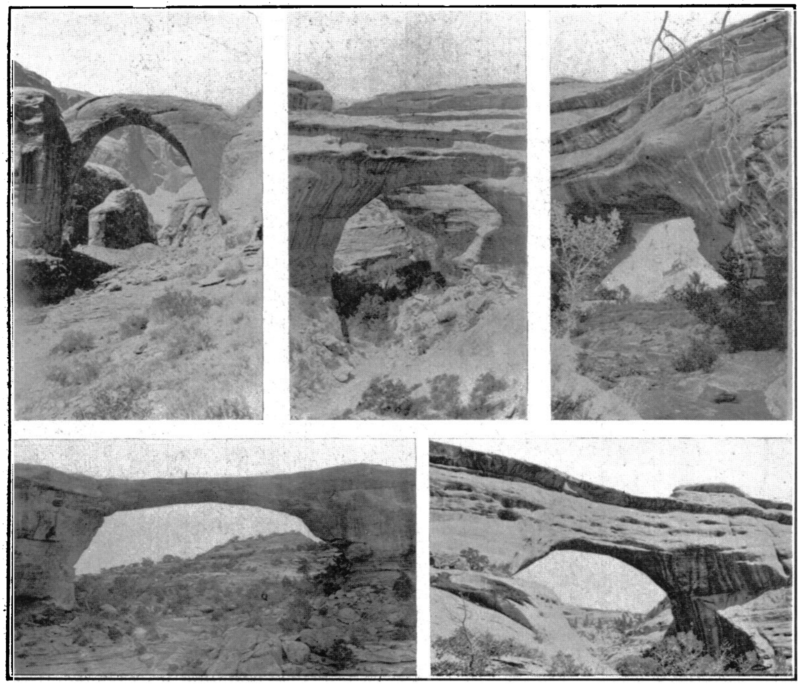
IN THE BLOOD OF MAMMALS

We might as well pass over the events during two or three million years, and come down to the midst of the Age of Mammals, or Tertiary time.

With the evolution of life on the globe new and interesting adventures were possible. When in the development of animal life high body temperatures and hot blood were produced I had experiences very different from those which I had in the body of the seajelly, or even in the real but cold blood of the ancient big reptiles.

One day I was in a trickle of water in an oasis of Asia, and some brute of the camel family happened along and drank up all the water. For days I was carried in his water-tank stomach. At last this water was absorbed and I was carried into the hot blood and finally built into one of the tiny red corpuscles. In this corpuscle I traveled about the camel's body thousands of times. The blood current in which I floated was truly a river of life. The red corpuscles and the thin, white fluid in which they floated, was swept rapidly through a stiff tube, the pulmonary artery, which quickly divided into small branches and finally into minute microscopic tubes, the capillaries, which were spread over the surface of the lung cells. Here, in the capillaries, the red corpuscles gave up some of the carbon-dioxide that they carried in combination with iron, and took on instead some oxygen, which changed the color of the corpuscle to a brighter red. This exchange of gases was through two membranes, the wall of the blood tube and that of the lung cell. Then with our load of oxygen we passed on through the capillaries into larger and larger tubes, the pulmonary veins. These poured us all into a sort of bag, called the left auricle. From this cavity we were sucked into a second, connecting chamber through a curious door consisting of three parts or valves. Then the thick, muscular walls of the second chamber, the left ventricle, suddenly collapsed or contracted and we were forced in a swift current through another large and stiff tube, the aorta, into the body substance of the animal.

The large tube divided and subdivided into thousands of branches, and these into minute tubules, the capillaries. Some of the larger tubes, systemic arteries, carried blood to certain muscles, some carried



N. M. Judd, photo.

FIG. 26. SAMPLES OF WATERMOL BRIDGE WORK.

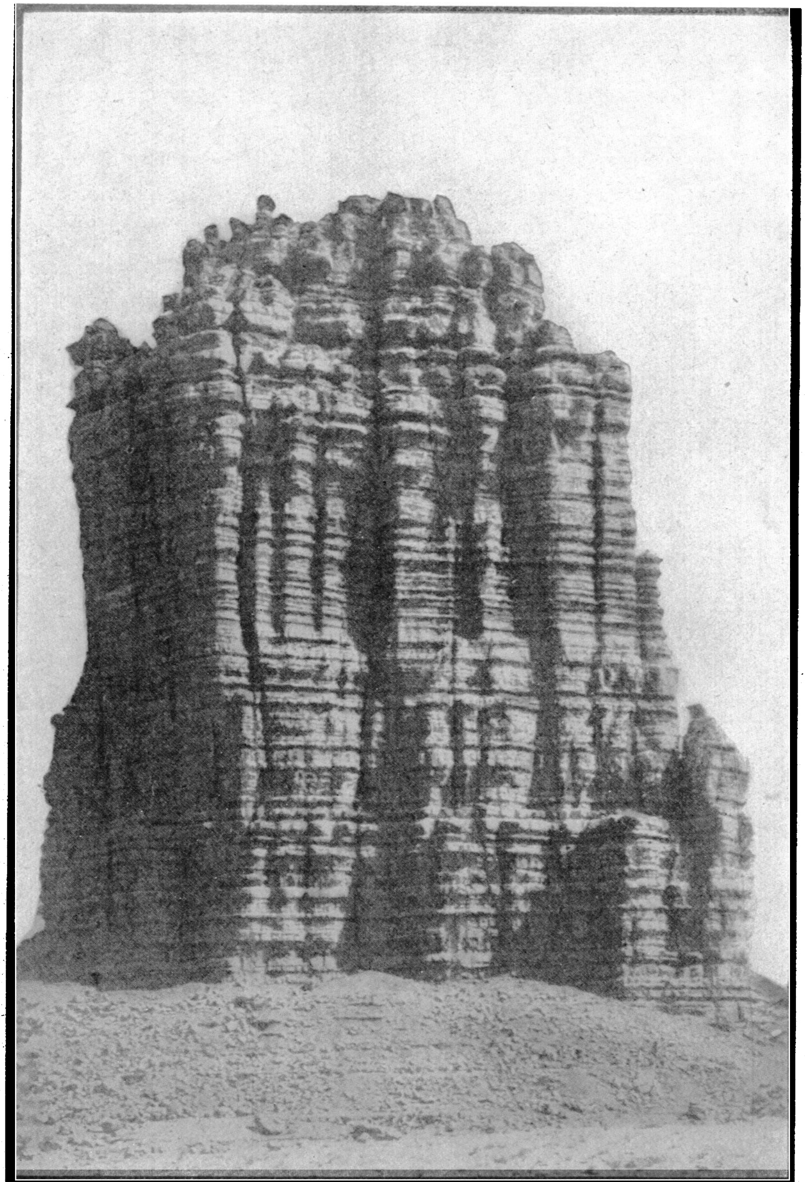


FIG. 27. JOINT WORK OF WATERMOLS AND WINDMOLS.

to the stomach, some to the brain, and some even to the muscle walls of the pump or heart itself. Every minute part of the animal's body was supplied with tubes and blood, except the hair and hoofs, which are dead matter.

I helped to carry the oxygen to all parts of the camel's body, sometimes to his brain, or his muscles, or his eye, or bones. The fluid part of the blood, in which the corpuscles floated, also carried the nourishment to all parts of the body, and this came from the food through the stomach and intestines.

The red corpuscles were like little boats in the river of the blood, carrying only the life-giving oxygen to the substances of the body. The oxygen burned up the old, or worn-out cells, so producing carbon-dioxide. This burning of the waste matter caused the heat of the body. Then the corpuscles took on a cargo of carbon-dioxide in exchange for the oxygen.

When we were through the capillary tubes, in whatever part of the body we happened to be, and had finished our work of changing cargo, we were gathered into larger and larger tubes, called veins, and finally into a big, soft tube, the vena cava, which poured us into a bag or chamber, the right auricle. From this we were drawn through another curious door into another chamber, the right ventricle, which suddenly contracted and sent us swiftly through the tube, the pulmonary artery, where I began this account of the blood circulation.

We watermols composed nearly all the substance of the blood fluid, the plasma, and of the corpuscles. Sometimes I was in one and sometimes in the other. It was lively work, getting nourishment from the food canal and oxygen from the lungs and carrying them to every cell of the whole body, and then taking away the waste material. We made a round trip, as described, in about one half of a minute, most of that short time being spent in the two sets of capillaries while changing cargoes. I was a part of the navigation system in the camel, and in the years that I was in that business I must have traveled a great many thousand miles. But I did not arrive anywhere.

It seemed that I might never escape. But one day, or night, for night and day were all the same, and we had no half-day or week-end holidays, we were hustled along unusually fast, for the pumping apparatus, the heart, was working tremendously because the camel was running. Then, of a sudden, everything stopped. The old camel was dead. He had been chased and killed by a tiger.

The tiger drank some of the camel's blood, and I was in the tiger. To make a long story shorter, I was carried into the tiger's blood, and for a time, a year or two, I served as a galley slave in the internal navigation system of the beast. It was similar to the work in the camel, only more rapid and with higher temperature.

Courtesy of Eastman Kodak Co.

FIG. 28. WATERMOLS TAKING A PLUNGE.

My escape from the tiger was in an unexpected and curious manner. One day, somewhere in southern Asia, my host, the tiger, had a fight to the death with an elephant. The elephant crushed him by kneeling on him, and some of his blood ran out on the ground. And so when the blood dried I escaped into the air.

AS A WORLD-EXPLORER

This story can tell only a part of my history of adventure in wandering about the earth. Many times that I need not describe have I been in the upper air; in cloud and terrible hurricane; and in the arching rainbow. Many times I have fallen into salt and fresh waters. I have helped to swell the Mississippi river and Gulf of Mexico; the Volga and Caspian sea; the Hwangho and Yellow sea; the Mackenzie river and the Arctic ocean.

Once I fell in Lake Victoria Nyanza and floated down the Nile and past the Pyramids, whose material I had helped to form, so many millions of years before. In this trip I was stranded on the Nile delta, and after a variety of happenings I found myself in the milk of a cocoanut. I had once been in the warm milk of a kangaroo, but this was different. A monkey cracked this nut and drank its milk, and there I was, in the monkey. But being in the stomach and blood and muscle of monkey is just about the same as in a man or a tiger.

One of the queerest events was when I had drifted to Australia and somehow had found myself in the egg of the duckbill, or platypus. I knew that it must be a mammal, because it had hair and warm blood. But when it laid a real egg with me in it, why, that really was something new. I just laughed and laughed until it spoiled the egg.

While I was in Australia I climbed in the sap of an Eucalyptus tree to the topmost branch, over three hundred feet high. This was higher than when I was in a California Big-Tree. But it was a glorious trip, in the High Sierras of California. When I was transpired from the leaf of the Big-Tree, the Sequoia Washingtonia, I was caught in a snowflake and fell on Mt. Shasta. When the snow melted in the springtime I went out into the Pacific ocean.

In this trip to the Pacific I had another queer adventure. In some way or other I found myself in a huge animal in the sea. It ought to have been some sort of fish, being so far out to sea. But it had warm blood, so I knew it must be a mammal. In my long life and varied experience I have learned a few facts. The beast was a whale. And one

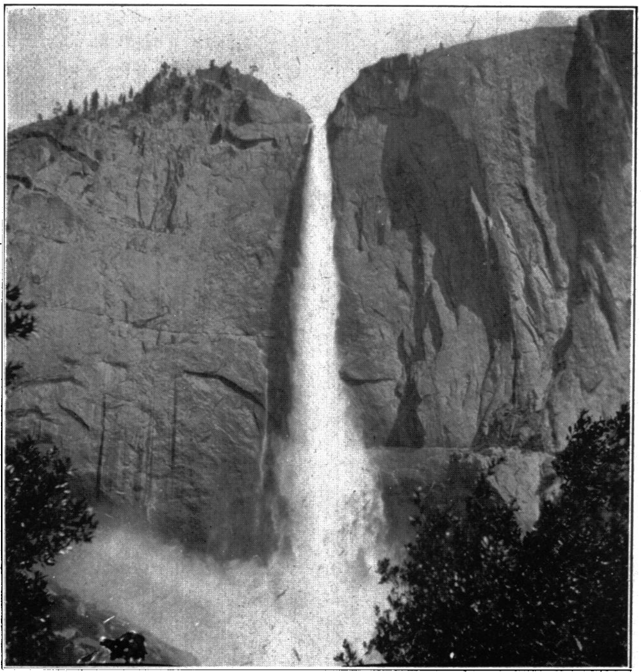


FIG. 29. A RECKLESS JUMP.

FIG. 30. AN UNFINISHED JOB.

day I was in the moist air of his lungs and he came to the surface of the sea and spouted the air into the atmosphere. That was the oddest way that I had ever found of getting back into the atmosphere. The nearest to it was when, in New Zealand, I got into the hot water of a geyser and was spouted by the exploding water of the geyser into the atmosphere. Speaking of spouts, I was once in a waterspout on the Atlantic.

In contrast with these events I may mention a few more dainty and quaint experiences. I have often been in the dewdrop on the grass and in the frost on the window-pane. I have been in the luscious fruits of both temperate and tropic climes; and in the fragrant nectar of many flowers.

Once in the honey sac of a clover blossom I was found by a bee, who took me in the nectar and packed me away in a wax cell of its honeycomb. This was a sweet time; even sweeter than when, in recent days, I was in the sap of sugar-cane and went through all the processes of the sugar mill. Finally one of the workers in the hive fed me to the queen bee, and I was a part of her royal ladyship. Then I passed out in one of her many eggs which became a male bee, or drone. He was stung to death by the workers for his lazy uselessness, and on his death I was liberated into the air.

EXPERIENCES WITH MAN

The appearance on the earth of the human animal gave opportunity for new experiences. Many of the tragedies in my later life, and some of the comedies, have been due to the singular circumstances produced by the activities of man. He seems to have brought, especially through his use of fire and control of electricity, new conditions or relations into the world.

I recall how in recent time I was once in the sap of a maguey plant, in Mexico, the agave, called in the north the century plant. A Mexican peon came along and cut out the large bud that would have pushed up as the fruit stalk. The sweet sap that collected in the cavity was sucked out, by the Mexican, with myself in it, and put in a pigskin bag and sent into the City of Mexico. This sap when fermented made the Mexican national drink, called pulque. I was in the pulque that was drunk by a Mexican, and—well! never mind the rest of the story. There are multitudes of peculiar drinks, better or worse, and mostly bad, and all composed chiefly of us watermols. I have been in several of them, but pulque was the "limit."

In China I had another poor time. While in a stream I was scooped up into a big cask and carried for months in the hold of a pirate junk. Then the Chinamen put me in a dirty kettle and boiled us with some tea leaves, and then drank us while hot.

Speaking of hot things reminds me of the hottest time that I ever had. It was the occasion of the great fire in Chicago. It seems to have been my luck, or misfortune, to be around so many times when

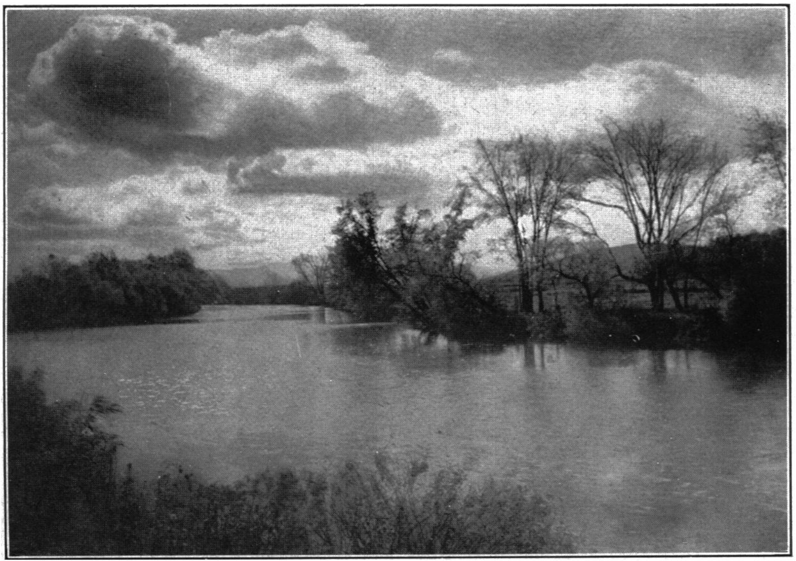
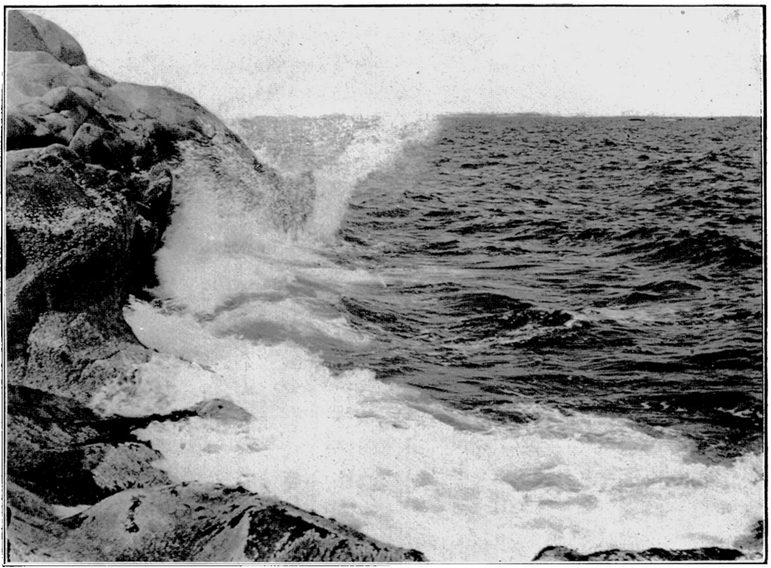


FIG. 31. WATERMOLS IN REPOSE.



Eastman Kodak Co.

FIG. 32. WHERE WATERMOLS NEVER REST.

something unusual was happening. Just then I was in the edge of Lake Michigan, and a fire engine sucked me out of the lake, pushed me through a long pipe, and then squirted me into the fire. That was the hottest ever; even hotter than in the New Zealand geyser. But I helped as much as any of the water to put out the fire.

Once I was in the sulphur water of a famous health resort, and was taken in by a pretty girl. But that was not specially different from being in a monkey or a whale.

GOOD-BYE

I am the true symbol of Life. All the organic substance of the world, the "living things," are composed of such as I. Combined with some nitrogen we form protoplasm, the basic substance of all life. Without us watermols there would be no plants or animals, and no food or drink. Of course there could be no lake, or river, or ocean; no beauty cloud of rosy sunrise or crimson sunset.

We do the work of the world. On us floats all the commerce of the water-world. We are the steam of your engines, and we are the masses of falling water which supply the power for your machinery or for changing mass energy to electricity.

We are also the great agent of destruction. All decay is by means of water. We rend the rocks by our expansion under cold. By wave and stream and glacier we slowly drag everything, even the mountains, into the sea. Sometime we may cover all the surface of this earth.

Like all living things I, individually, am not immortal. But my units, or atoms, are. My substance is eternal. There are ways in which I might be destroyed, particularly by human devices. Very intense heat would drive apart my three atoms. I feared this when I was caught in the Chicago fire. In some chemist's laboratory I might be destroyed by some chemic reaction. And a lightning bolt might separate my atoms.

But I have existed so many millions on millions of years that I expect to last awhile. I am still young and seeking diversion and adventure. I can not predict at all where I may be during the coming one hundred million years. Possibly I may conclude to leap away from the earth into outer space and seek some other less known field for far adventure.

But you may look for me yet awhile. Think of me in the high frost crystal of the cirrus cloud, or as down in the abyssal depth of the deepest and coldest ocean; or in the falling snowflake, or the rising mist of the morning; or in the cloud-banner on the tropic mountain top or in the cold fog of an arctic valley; in the peaceful rainbow or in the terrible tornado; perhaps in the sparkling draught of your happy festivals, or in the idle tears of pretty girlhood.

Now, I must be going. Rest is impossible, even for a watermol. There are more adventures to come, and I seek them. Good-bye. We may meet again.

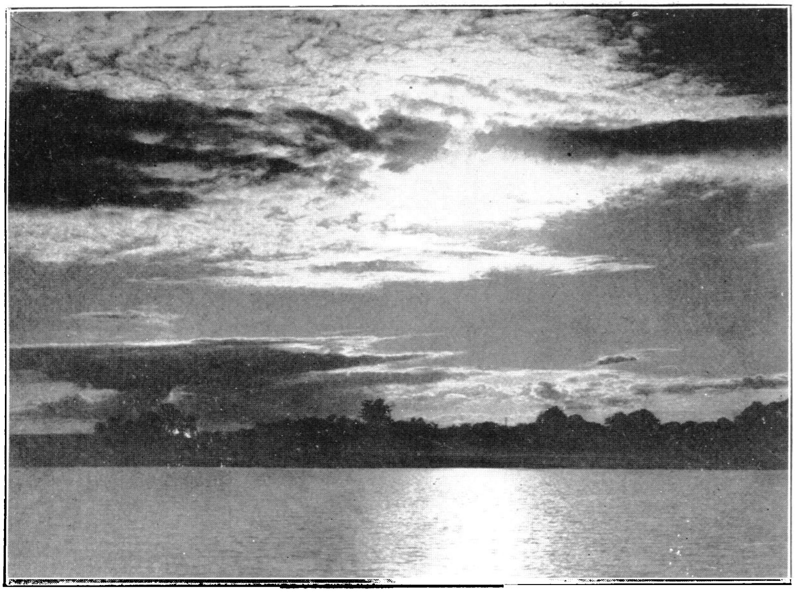


FIG. 33. GOOD NIGHT.